Exhibit E

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Manual Chapter : Creating Custom Classifications

Applies To:

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BIG-IP PEM
14.0.1, 14.0.0,
13.1.3, 13.1.1, 13.1.0

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Overview: Creating custom classifications

Traffic Intelligence analyzes and identifies higher level protocols and applications. It has the ability to detect applications and protocols in Service Provider networks, for example, HTTP, popular P2P, and top categories (Audio/Video, File Transfer, Instant Messaging, Mail, P2P, Web). It provides an application update mechanism, which in turn, provides the ability to keep up with new, modified, or obsolete applications without going through software release upgrades. IP traffic classifications are based on the IP protocol field of the IP header (IANA protocol).

Note: *You can update the library (so) and signature definitions for web traffic (cpm) with hitless upgrade in Policy Enforcement Manager™ (PEM™).*

Task summary

Determining and adjusting traffic classifications

The BIG-IP® system classifies many categories of traffic and specific applications within those categories. You can determine which categories and applications of traffic the system can classify, and find out information about them such as their application or category ID.

1. On the Main tab, click **Traffic Intelligence** > **Applications** > **Application List** .
   The Applications screen displays a list of the supported classification categories.
2. To view the applications in each category, click the **+** icon next to the category.
3. To view or edit the properties of the application or category, click the name to open its properties screen.
   Tip: Here you can view the application or category ID number.
4. Click **Update** to save any changes.

Creating a category

On the BIG-IP® system, you can create customized categories for classifying traffic if the predefined categories are not sufficient for your needs. For example, if you plan to create new application types unique to your organization, you can create a category to group them together.

1. On the Main tab, click **Traffic Intelligence** > **Applications** > **Application List** .
   The Applications screen displays a list of the supported classification categories.

2. Click **Create**.
   The New Application screen opens.

3. From the **Type** list, select **Category**.

4. In the **Name** field, type a name for the classification category.

5. In the **Description** field, type optional descriptive text for the classification presets.

6. In the **Category ID** field, type an identifier for this category, a unique number.

7. For the **Application List** setting, move applications that you want to associate with this category from the **Unknown** list to the **Selected** list.
   If the applications are not listed yet, you can associate the applications with the category when you create them.

8. Click **Finished**.

You have created custom applications to handle traffic.

Creating classification presets

On the BIG-IP® system, you can create classification preset settings for a classification policy that you have previously created.

1. On the Main tab, click **Traffic Intelligence** > **Presets** .
   The Presets screen displays a list of the supported classification categories.

2. Click **Create**.
   The New Presets screen opens.

3. In the **Name** field, type a name for the application.

4. In the **Description** field, type optional descriptive text for the classification presets.

5. For the **Policy** setting, move the classification policies from **Available** list to the **Selected** list, to create a new preset.

6. In the **Allow Reclassification** list, **Enabled** is the default selection.

7. In the **Flow Bundling** list, **Enabled** is the default selection.

8. In the **Cache Results** list, **Enabled** is the default selection.

9. Click **Finished**.

Creating a custom URL database

You can create a customized URL database that can be used for adding custom URLs and categories.

1. On the Main tab, click **Traffic Intelligence** > **Categories** > **Feed Lists** .
   The URL DB feed list screen opens.

2. Click **Create**.
   The New Feed List screen opens.

3. In the **Name** field, type a unique name for the URL feed list.

4. From the **State** list, select **Enabled**.

5. In the **Description** field, type optional descriptive text for the URL feed list.

6. In the **Category ID** field, select a category name from the drop-down list.

7. In the URL DB Location area, select the appropriate option for URL DB location.

Option	Description

File	Click the **Browse** button, and select the customdb file. The customdb file should be present on your machine and not present on the BIG-IP system. The customdb file is a CSV file of the format: URL/IPv4 [,cat1] [,cat2]...
	Note: *The non-IP URL should have an IANA-registered top level domain. The URL category ID should be in the form of an integer, and the valid range is 24576 to 32767.*
	For example, sample lines of a `customdb` entry are:
	`weather.gov, 28678`
	`pconline.com.cn, 28679`
	`kannadaprabha.com, 28680`
	`yandex.ru, 28677, 28676, 28681`
	`pitt.edu,28682`
	Note: *Entries in feed lists must consist of all lowercase characters. Also, any entry of the form www.**tld** or www.**domain**.com will not match.*

FTP	Type the ftp location and the **User** and **Password**.
HTTP	Type the HTTP location and the **User** and **Password**.
HTTPS	Type the HTTPS location and the **User** and **Password**.

8. In the **Poll Interval** field, type the time interval in hours at which the url needs to be polled.

9. Click **Finished**.

The category lookup is done in the custom database, and the URL list is loaded into the custom database through file input. You can also perform URL categorization by looking up the server name indication (SNI) in SSL traffic.

Using iRules with classification categories and applications

If you are using custom classification categories or applications, you can use iRules® to identify the traffic for the custom classifications, or you can initiate an action based on how the traffic is classified.

1. On the Main tab, click **Local Traffic** > **iRules** .
2. Click **Create**.
3. In the **Name** field, type a 1- to 31-character name.
4. In the **Definition** field, type the syntax for the iRule using Tool Command Language (Tcl) syntax.
   For example, to classify traffic as xxx_app, a custom classification application that you created, you can use this iRule:
   ```
   when HTTP_REQUEST {
                           if { [HTTP::header "Host"] contains "xxx" }  {
                           CLASSIFY::application set xxx_app
                           }
                           }
                           }
   ```
   For example, to perform an action (in this case, drop) on traffic classified as xxx_app, you can use this iRule:
   ```
   when CLASSIFICATION_DETECTED {
                           if { [CLASSIFICATION::APP == "xxx_app"]}  {
                           drop
                           }
                           }
   ```
   For complete and detailed information about iRules syntax, see the F5 Networks DevCentral web site http://devcentral.f5.com.
5. Click **Finished**.

After creating the iRules, you must assign them as resources for each relevant virtual server on the BIG-IP® system.

Modifying iRule event for URL categories

On the BIG-IP® system, you can modify iRules® Event settings for URL categories.

1. On the Main tab, click **Traffic Intelligence** > **Categories** > **Category List** .
2. Select a URL category.
   The URL Properties screen opens.
3. In the **Name** field, type a unique name for the URL category policy.

4. In the **Description** field, type optional descriptive text for the classification presets.
5. In the **Category ID** field, type an identifier for this category, a unique number.
6. For the **Application List** setting, move applications that you want to associate with this category from the **Unknown** list to the **Selected** list.
   If the applications are not listed yet, you can associate the applications with the category when you create them.
7. Click **Finished**.
8. On the Main tab, click **Local Traffic** > **Profiles** > **Classification** .
   The Classification screen opens.
9. Select a classification profile or create one.
10. From the **URL Categorization** field, select **Enabled** from the drop-down list.
11. In the **iRule Event** field, select the appropriate setting.
    - To trigger an iRule event for this category of traffic, select **Enabled**. You can then create an iRule that performs an action on this type of traffic.
    - If you do not need to trigger an iRule event for this category of traffic, select **Disabled**.

    Note: *`CLASSIFICATION::DETECTED` is the only event that is supported.*

You have modified an iRule event setting for an existing URL category.

Classification iRule commands

When the BIG-IP® system identifies a specific type of traffic with iRules® enabled, it triggers a `CLASSIFICATION_DETECTED` event. You can use the commands within iRules for additional system flexibility to classify the flow as one or more of the application or category classifications. The CLASSIFY commands are available from the `HTTP_REQUEST` or `HTTP_RESPONSE` iRule events.

iRule Command	Description
CLASSIFICATION::app	Gets the name of the classified application (the most explicit classified application).
CLASSIFICATION::category	Gets the category of the application.
CLASSIFICATION::disable	Disables the classification for a flow.
CLASSIFICATION::enable	Enables the classification for a flow.
CLASSIFICATION::protocol	Gets the name of the classified protocol (the least explicit classified application).

iRule Command	Description
CLASSIFY::application set ***appname***	Classifies the flow as ***appname*** and associates the category that ***appname*** belongs to.
CLASSIFY::category set ***catname***	Classifies the flow as ***catname*** and also associates the flow with the unknown category.
CLASSIFY::application add ***appname***	Adds the application ***appname*** to the classification statistics.
CLASSIFY::category add ***catname***	Adds the category ***catname*** to the classification statistics.